

AN EXTINCT NEW SPECIES OF CORMORANT (PHALACROCORACIDAE, AVES) FROM A WESTERN AUSTRALIAN PEAT SWAMP

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Microcarbo serventyorum n.sp. is described from a pelvis with proximal parts of the femora and some caudal vertebrae, which were found in a peat swamp at West Bullsbrook, north of Perth, Western Australia. Age is not known, but is probably Holocene. These bone exaggerated the pelvic differences between those of small extant species of *Phalacrocorax* and *Microcarbo* and are therefore included as a new species in the latter genus. Presumably *M. serventyorum* was able to forage in even more confined waters than other species of *Microcarbo*.

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At the 16th International Ornithological Congress in Canberra, I postulated that Australasia might be the main centre of generic and sub-generic divergence of the extant Phalacrocoracidae (van Tets 1976). Since then Siegel-Causey (1988) raised my generic separation of cormorants, *Phalacrocorax* versus shags, *Leucocarbo* to that of the subfamilies Phalacrocoracinae and Leucocarbininae. I agree with these subfamilies (van Tets pp. 808–809 in Marchant & Higgins 1990), but disagree with some of Siegel-Causey's generic and specific arrangements in those subfamilies. In particular I accept as cormorants in the Phalacrocoracinae only *Microcarbo* and *Phalacrocorax* including the sub-genus *Hypoleucos*.

Evidence for a new extinct Australian species of cormorant is provided by a pelvis with proximal parts of the femora and some caudal vertebrae (Figs 1–4). They were found 9 January 1970 in a peat swamp at mining lease 19H 'Melaleuca', West Bullsbrook, at 30 km north of Perth, Western Australia (31°41'S 115°59'E). They were noticed on a stockpile, before loading on to a truck, but after rotation and blading, from an estimated depth of about one foot (=0.3 m). Age is not known, but is probably late Holocene. C. Mizen forwarded it per A. R. Burns to Duncan Merrilees at the Western Australian Museum, who registered it 12 February 1970 as WAM 70.2.10.

WAM 70.2.10 was compared with a wide range of material in the collections of the Australian Museum (AM) Sydney, the Australian National Wildlife Collection (ANWC) CSIRO Canberra and the University of Michigan Museum of

Zoology (UMMZ) Ann Arbor. The material included all families and genera of Pelecaniformes and most species of Phalacrocoracidae including all of *Microcarbo* (*sensu* van Tets 1976).

SYSTEMATICS

In penguins (Spheniscidae), darters (Anhingidae), cormorants and shags (Phalacrocoracidae), the cranial facet of the pelvis is convex and not concave as in frigatebirds (Fregatidae), gannets and boobies (Sulidae), nor saddle-shaped as in pelicans (Pelecanidae), tropicbirds (Phaethontidae) and in almost all other kinds of birds.

The pelves of the Spheniscidae differ from those of the Anhingidae and Phalacrocoracidae by having a fenestrated preacetabular ala of the ilium and lacking ventral spines (van Tets & O'Connor 1983). On the pelves of the Anhingidae prominent ilial crests flank the median dorsal ridge and shield (Olson 1975) and on those of the Phalacrocoracidae only the caudal half of the shield. In the shield there are up to six pairs of postacetabular foramina in Anhingidae and up to eight in Phalacrocoracidae. These foramina are relatively smaller in Anhingidae than in Phalacrocoracidae.

On the femur, the trochanter is about as tall as the head in Phalacrocoracidae and not lower as in WAM 70.2.10, Anhingidae and Sulidae (van Tets *et al.* 1989).

On the ilia lateral to the first pair of postacetabular foramina is a pair of rough

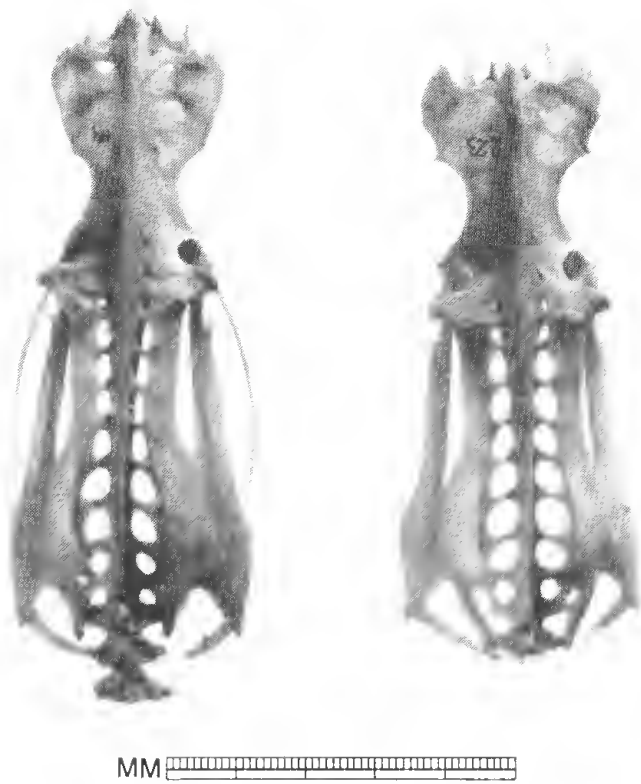


FIGURE 1. Dorsal view of pelvis. Left: *Phalacrocorax sulcirostris* ANWC BS-1310. Right: *Microcarbo melanoleucos* ANWC BS-1419.

irregular 'facets', which are about as wide as broad in *Phalacrocoracinae* and are longer than broad extending alongside the second pair of foramina in *Leucocarbinae*, but are variable and intermediate in the Pied cormorant, *Phalacrocorax varius*, and the Black-faced shag, *Leucocarbo fuscescens*.

The first four pairs of postacetabular foramina are about twice as long as wide in *Phalacrocorax* and relatively broader and less than twice as long as wide in *Microcarbo*. The concave preacetabular lateral edge of ilium is relatively long in *Microcarbo* and short in *Phalacrocorax*. The pelvis is relatively longer and more slender in *Phalacrocorax* than in *Microcarbo*.

Because WAM 70.2.10 fits the above characters of *Microcarbo*, except for the femora, I propose a new specific name for it.

Microcarbo serventyorum sp. nov.

Etymology

In honour of the Serventy brothers, Dom and Vincent, for their contributions to our knowledge



FIGURE 2. Dorsal view of pelvis. *Microcarbo serventyorum* WAM 70.2.10.

of the Australian cormorants and shags (Serventy 1938, 1939, Serventy & White 1943, Serventy *et al.* 1971).

Diagnosis

A cormorant slightly smaller than species of *Microcarbo* and *Phalacrocorax*, relatively long preacetabular concave lateral edge on ilium; relatively broader first four pairs of postacetabular foramina adjacent to narrower ilia, and much larger 8th pair than in species of *Microcarbo* and *Phalacrocorax*. Parapophyses between 7th and 8th pair extend cranio-laterally and not laterally as in *Microcarbo* and *Phalacrocorax* (See figs 1-4).

Measurements of WAM 70.2.10 are generally more than ± 3 sd away from mean measurements of the smallest extant species of *Phalacrocorax*, and differ from all extant species of *Microcarbo*. These differences are most marked in the length of the dorsal ridge of the pelvis, the length of the 8th postacetabular foramen, and the proximal width of the femur (Table 1).



FIGURE 3. Caudal view of left femur. Left: *Microcarbo* ANWC BS-1419. Right: *Phalacrocorax sulcirostris* ANWC BS-1310.

Holotype

WAM 70.2.10, a pelvis with associated femora and caudal vertebrae.

DISCUSSION

Australasia has four sympatric species of cormorants that occur on inland waters, which is

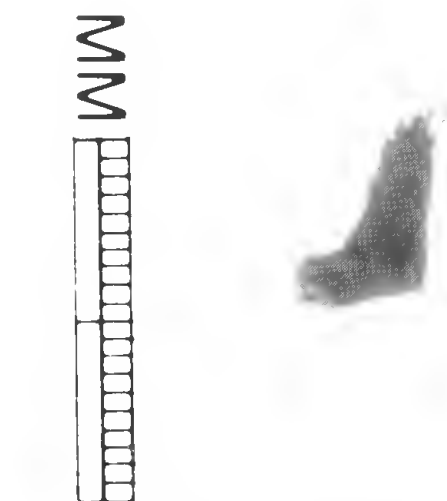


FIGURE 4. Caudal view of left femur. *Microcarbo serventyorum* WAM 70.2.10.

more than anywhere in the world. Two are large, the Great cormorant, *Phalacrocorax carbo*, and the Pied cormorant, *P. varius*, and forage in rivers and large lakes and lagoons. Two are small, the Little black cormorant, *P. sulcirostris*, and the Little pied cormorant, *Microcarbo melanoleucos*. *Phalacrocorax sulcirostris* forages mainly in flocks in open water and *M. melanoleucos* forages in ponds, streams and along edges of large water bodies. Species of *Phalacrocorax* swim rapidly with their feet behind the body, while species of *Microcarbo* swim slowly with their feet beside

TABLE 1. Measurements (mm) of pelvis and femora of species of *Microcarbo* and *Phalacrocorax*.

A: \bar{x} (sd, range, n)				
	<i>M. melanoleucos</i>	<i>P. sulcirostris</i>	<i>P. olivaceus</i>	
TL	82 (4, 73-88, 13)	97 (6, 84-113, 25)	102 (7, 95-109, 3)	
WA	25 (1.4, 23-28, 15)	27 (1.4, 24-30, 25)	30 (2.3, 27-31, 3)	
LF	2.8 (0.4, 2.0-3.3, 14)	3.2 (0.3, 2.6-3.9, 25)	3.3 (0.4, 2.9-3.6, 3)	
PW	11 (0.7, 9-12, 14)	12 (0.8, 11-14, 25)	13 (1.2, 12-14, 3)	
DH	5.0 (0.3, 4.5-5.5, 14)	4.9 (0.3, 4.3-5.3, 25)	5.6 (0.6, 4.9-6.0, 3)	
TL/WA	3.2 (0.13, 3.0-3.5, 13)	3.6 (0.18, 3.2-38, 25)	3.4 (0.17, 3.2-35, 3)	

B: n = 1

	<i>M. africanus</i>	<i>M. coronatus</i>	<i>M. pygmaeus</i>	<i>M. niger</i>	<i>M. serventyorum</i>
TL	79	77	81	77	71
WA	25	26	26	23	22
LF	2.5	2.7	2.7	2.9	5.1
PW	11	11	11	9	7.5
DH	4.7	4.6	5.0	4.1	4.3
TL/WA	3.2	3.0	3.1	3.3	3.2

Abbreviations: TL = length of medium dorsal ridge of pelvis, WA = width between tips of antitrochanters, LF = length of 8th postacetabular foramen, PW = proximal width of femur, and DH = depth of head of femur.

the body. Exaggeration of pelvic features that distinguish extant species of *Microcarbo* from those *Phalacrocorax* suggest that *Microcarbo serventyorum* was even more adept at foraging in confined bodies of water. Its small size and discovery in a peat swamp suggest that *M. serventyorum* lived in marshes with dense vegetation, small pools and narrow creeks. It may have had a niche distinct from that of the other four species of cormorant and may have been part

of the Australasian divergence I postulated (van Tets 1976).

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